Center Innovation Fund: KSC CIF

Voxel Advanced Digital-manufacturing for Earth & Regolith in Space (VADERS)

Completed Technology Project (2015 - 2016)

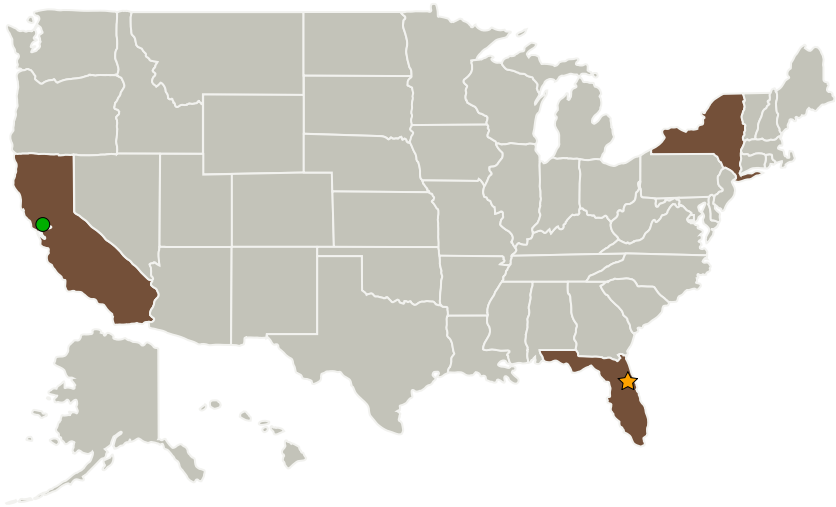
Project Introduction

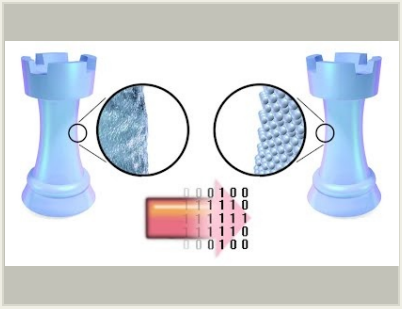
A voxel is a discrete three-dimensional (3D) element of material that is used to construct a larger 3D object. It is the 3D equivalent of a pixel. A characteristic proof of concept device using regolith derived materials will be researched, conceptualized, designed, fabricated & tested in a lab environment.

Anticipated Benefits

This project intends to show that the previous modeling of Voxels done by others can be rapidly translated into a physical instantiation of the three dimensional object that was virtually modeled using software methods only. In addition, indigenous materials found on planetary surfaces and asteroids will be used to show how this technique could be used to fabricate objects in space. Such a capability is the key to reducing logistics from Earth to Space and will provide substantial mass launch savings as well as operational flexibility and robustness.

Primary U.S. Work Locations and Key Partners





Digital coding for voxel manufacturing

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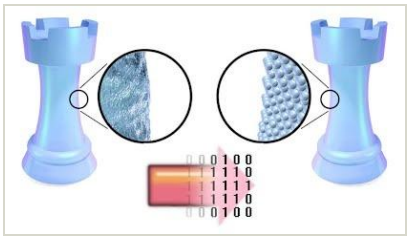
Organizations Performing Work	Role	Type	Location
Kennedy Space Center(KSC)	Lead Organization	NASA Center	Kennedy Space Center, Florida
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California
Cornell University	Supporting Organization	Academia	Ithaca, New York

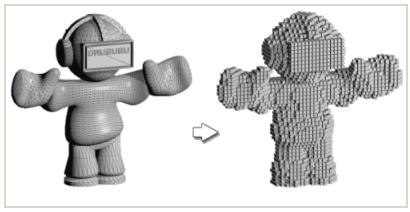
Co-Funding Partners	Type	Location
Columbia University in the City of New York	Academia	New York, New York

Primary U.S. Work Locations	
California	Florida
New York	

Images



Digital coding for voxel manufacturing
Digital coding for voxel manufacturing
(https://techport.nasa.gov/image/16582)



Object made of voxels
A 3D object coverted into voxels
(https://techport.nasa.gov/image/16574)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Center / Facility:
Kennedy Space Center (KSC)

Responsible Program:
Center Innovation Fund: KSC CIF

Project Management

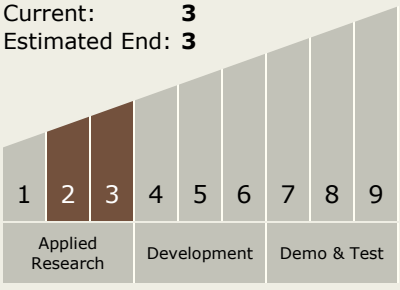
Program Director:
Michael R Lapointe

Program Manager:
Barbara L Brown

Principal Investigator:
Robert P Mueller

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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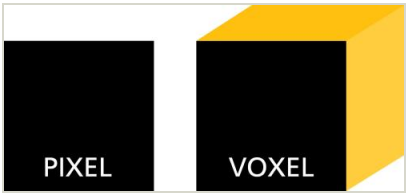

Pixel - Voxel Comparison
A voxel is a discrete 3D element of material that is used to construct a larger 3D object. It is the 3D equivalent of a pixel. *(https://techport.nasa.gov/image/16573)*

Project Website:

https://www.nasa.gov/directorates/spacetech/home/index.html

Technology Areas

Primary:

- TX07 Exploration Destination Systems
  - TX07.2 Mission Infrastructure, Sustainability, and Supportability
    - TX07.2.2 In-Situ Manufacturing, Maintenance, and Repair

Target Destination

Earth